SECTION 02640

VALVES, HYDRANTS, AND BLOW-OFFS

PART 1 – GENERAL

1.1 SCOPE OF WORK

The work covered by this Section relates to valves, fire hydrants, blow-offs, and other appurtenances for waterlines including type valves required, installation, and testing.

1.2 TYPE VALVES REQUIRED

Unless shown otherwise on the Plans or approved by the Engineer, valves on waterlines twelve (12") inches and smaller shall be gate valves; and valves on waterlines sixteen (16") inches and larger shall be butterfly valves.

1.3 STORAGE OF MATERIALS

The Contractor shall be responsible for safely storing, in accordance with manufacturer's recommendations, materials that have been accepted on the job until they have been incorporated into the completed project. Keep the interiors of all valves, hydrants, and other accessories free from dirt and foreign matter at all times.

1.4 DEFECTIVE MATERIALS

It shall be the Contractor's responsibility to insure that all necessary materials are furnished, and that those found to be defective in manufacture are replaced at no extra cost to the Owner. Materials damaged in handling after being delivered by the manufacturer shall be replaced at the Contractor's own expense. If installed material is found to be defective before the final acceptance of the work, the cost of both the material and labor needed to replace it shall not be passed on to the Owner.

1.5 RELATED WORK SPECIFIED ELSEWHERE

Refer to following Sections of these Specifications for work related to this Section:

A. Section 02221W – Trenching, Bedding and Backfilling for Water Lines, Sewage Force Mains and Repurified Water Lines.

1.6 STANDARDS

Where materials and methods are indicated in the following specifications as being in conformance with a standard specification, it shall refer in all cases to the latest edition of the specifications and shall include all interim revisions. Listing of a standard specification without further reference indicates that the particular material or method shall conform with such listed specification.

All materials to be incorporated in this project shall be first quality, new, and undamaged material conforming to all applicable portions of these specifications. Where deviation from the specifications is necessary because of changes in manufacturing procedures, inability to obtain the specified product, or other extenuating circumstances, a request for the proposed substitution shall be submitted to the Engineer in writing for consideration. Materials failing to conform to these specifications shall not be delivered to the job site unless the Contractor has written approval from the Engineer covering the substitute materials.

PART 2 – PRODUCTS

2.1 GATE VALVES

Gate valves shall be resilient seated, solid wedge, manufactured to meet or exceed the requirements of AWWA C509 **or C515** of latest revision and in accordance with the following specifications, and shall be American Flow Control, Mueller, U.S. Pipe Company,
M & H, or approved equal.

Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

The valves are to be non-rising stem with the stem made of cast, forged, or rolled bronze as described in AWWA C509 **or C515**. Two stem seals shall be provided and shall be of the O-ring type.

The stem nut, also made of bronze, may be independent of the gate or cast integrally with the gate. If the stem nut is cast integrally, the threads shall be straight and true with the axis of the stem to avoid binding during the opening or closing cycle.

The sealing mechanism shall consist of a cast iron or ductile iron gate having a vulcanized synthetic rubber coating or a rubber seat mechanically retained on the gate. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

The valve body, bonnet, and bonnet cover shall be cast iron ASTM A126, Class “B” or ductile iron ASTM A395 or A536.

Valves shall be designed to withstand a hydrostatic test pressure of three hundred (300) pounds per square inch, applied internally with the gates closed, and shall be guaranteed for not less than one hundred fifty (150) pounds water working pressure unless otherwise shown on plans.

Buried valves shall be mechanical joint and equipped with a two (2”) inch square operating nut. Valves in structures shall be flanged and equipped with removable hand wheel operators. Wedges shall be of all bronze, side wedge type, for valves eight (8”)

inch diameter and smaller, and cast iron bronze mounted for ten (10") inch and larger valves. Stem collar bushings shall be all bronze. Valves shall open to the left.
All valves are to be tested in strict accordance with AWWA C509 **or C515**, latest revision. The Contractor shall furnish the Engineer with certificates of inspection, sworn to by the factory inspector, in the presence of a Notary Public, stating that the valves were made and satisfactorily tested in full compliance with AWWA C509 **or C515**.

2.2 BUTTERFLY VALVES

Butterfly valves shall be of heavy cast iron or ductile iron construction with mechanical joint ends, and shall be designed for underground installation. Valves shall be the GROUNDHOG type as manufactured by Henry Pratt Company, American Flow Control, or approved equal. Valves shall be equipped with suitable gearing and an enclosed gear case. Valves shall have permanent packing, self-lubricating bearings, and one-piece stainless steel shafts with ductile iron or Ni-resist disc keyed to shaft. Seating surface shall be resilient synthetic Buna-N rubber, securely fastened to prevent separation or distortion. The operating nuts shall be standard two (2") inch square nuts, opening left.

Valves shall be rated for minimum one hundred fifty (150) psi service and shall be tested to one hundred fifty (150) psi with drop tight shutoff unless otherwise shown on plans. Valves shall equal or exceed AWWA Specification C504, latest revision. The Contractor shall furnish the Engineer with certificates of inspection, sworn to by the factory inspector, in the presence of a Notary Public, stating that the valves were made and satisfactorily tested in full compliance with AWWA C504.

2.3 TAPPING SLEEVES AND VALVES

Tapping sleeves shall consist of a mechanical joint tapping sleeve and a valve with a mechanical joint outlet. The valve shall conform to all applicable specifications for gate valves.

2.4 FIRE HYDRANTS

Fire hydrants shall be iron bodied, fully bronze mounted hydrants manufactured to equal or exceed AWWA Specifications C502, latest revision. Hydrants shall be suitable for one hundred fifty (150) psi working pressure and shall be subjected to a test pressure of three hundred (300) psi. Inlet connection shall be six (6") inches, mechanical joint. Main hydrant valve shall be compression type, closing with pressure, with five and one-fourth (5¼") inch valve opening. Hydrants shall be furnished with forty-two (42") inch minimum bury and shall be **American Flow Control B62B**, or Mueller Centurion, traffic type, or M & H Valve Company, Style 129.

All hydrants shall be equipped with two (2) two and one-half (2½") inch nozzles, one (1) four and one-half (4½") inch pumper nozzle, breakable safety flange, and safety stem coupling. Bronze nozzles shall be securely locked to prevent them from blowing off. Hose threads shall be National Standard. Nozzle caps shall be equipped with non-kink chains.

Fire hydrant extension kits shall be of standard manufacture for **American Flow Control**, or Mueller Centurion, or M & H Valve Company. All fire hydrant extension pieces shall be furnished with a bituminous coating for bury. All surplus materials from the fire hydrant extension kits (i.e. nuts, bolts, flanges, lubricating oils) shall be turned over to the Murfreesboro Water & Sewer Department after completing hydrant adjustments.

Hydrants shall be of the "dry head" type with provisions for lubrication of stem threads and bearing surfaces. O-ring seals shall be provided to keep water out of the hydrant top. Operating nut shall be one and one-half (1½") inch pentagon, opening to left, and shall be equipped with a weather cap.

Hydrants shall be provided with automatic multiport drain ports arranged to momentarily flush under pressure each time hydrant is operated. A positive stop shall be provided on the operating stem to prevent over-travel when operating valve. Fire hydrants shall be supplied with a bituminous coating for buried portion of hydrant and standard yellow finish for above ground portions of the hydrant.

The Engineer shall be furnished with certificates of inspection, sworn to by the factory inspector in the presence of a Notary Public, stating that the hydrant and all material used in its construction conform to the applicable requirements of AWWA C502 and these supplementary specifications, that all tests specified therein have been performed and all test requirements have been met. Records of such tests shall be provided upon request.

2.5 VALVE BOXES

Valve boxes shall consist of precast concrete sections with cast iron frames and covers. The precast concrete sections are each approximately six (6") inches high with a minimum inside opening of eleven by thirteen (11" x 13") inches. Manufacturer shall be Hula Concrete Products of Hickman, TN**, or Thomas Holton of Christiana, TN** or approved equal.

The cast iron frames and covers shall be roadway type, John Bouchard No. 8006, or equal, having inside dimensions of eleven by thirteen and one-fourth (11" x 13¼") inches and a height of six and one-half (6½") inches. The combined weight of frame and cover shall be one hundred ninety-five (195) pounds.

2.6 BLOW-OFF VALVE ASSEMBLIES

Blow-off valve assemblies shall be a two and one-quarter (2¼") inch M & H (Style 33) Post Type Hydrant, **John C. Kupferle Foundry (Eclipse No. 2), or approved equal**, and shall be constructed in accordance with the Standard Detail Drawing.

PART 3 – EXECUTION

3.1 GENERAL

Installation of valves and fire hydrants shall conform to provisions of these specifications and recommendations of the manufacturer.

3.2 VALVES AND VALVE BOXES

Valves shall be installed in the waterline at the locations shown on the Plans or as directed by the Engineer, and in accordance with the Standard Detail Drawing and these specifications. Valves shall be installed in a horizontal run of pipe with valve stems in a vertical position. Buried valves shall have a two (2") inch square operating nut.

Provide a valve box for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed by the Engineer.

3.3 FIRE HYDRANTS

Fire hydrants shall be installed at the locations shown on the Plans or as directed by the Engineer and in accordance with the Standard Detail Drawing and these specifications. The hydrant shall be set in a vertical position at the edge of the street right-of-way with the pumper nozzle facing the street. **The height of the pumper nozzle shall be eighteen (18) inches from the center of the nozzle to finished grade at minimum.** At street intersections, the pumper nozzle shall face the street designated on the plans or as directed by the Engineer.

All fire hydrant leads shall include **a swivel/hydrant tee,** a six (6") inch mechanical joint gate valve attached to the six (6") inch side outlet of the main line tee by means of mega-lugs or rods as shown on the Standard Detail Drawing and as described herein. The mega-lugs shall be placed at the tee outlet, both sides of the gate valve, and at the fire hydrant. Where 6" PVC pipe is permitted for the fire hydrant lead, rods are required instead of retainer glands.

The concrete thrust blocks shall have bearing areas against the undisturbed trench but shall not cover the flanges or drain ports. At least ten (10) cubic feet of crushed stone shall be provided around the hydrant for drainage.

Hydrants on streets with curbs and gutters shall be set so that the breakage flange is at the same elevation as the top of the curb. In other areas hydrants shall be set so that the finished ground level will be just below the breakage flange, or at the bury level indicated on the hydrant. The lower barrel of the hydrants shall be of sufficient length to enable the hydrant lead to be installed horizontally, even though the hydrants may be located in an embankment.

Installed hydrants shall have an undamaged enamel coating, and oil reservoirs shall be filled.

3.4 BLOW-OFFS

Blow-offs shall be installed at the locations shown on the Plans, or as directed by the Engineer, and in accordance with the Standard Detail Drawing and these specifications.

Unless otherwise indicated on the Plans, all blow-offs shall have a two and one-quarter (2¼") inches main valve opening consisting of two (2) feet minimum of three (3") inch ductile iron pipe or C900 from water main, connecting to a M & H (Style 33), John C. Kupferle Foundry Eclipse No. 2 Post Type Blow-off Hydrant, or approved equal.

Concrete blocking shall be as shown on the Standard Detail Drawing.

END OF SECTION 02640